

# SEQUENCE LISTING

<110> James Karras  
Erich Koller

<120> ANTISENSE MODULATION OF TOLL-LIKE RECEPTOR 4 EXPRESSION

<130> ISPH-0618

<160> 33

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 1

tccgtcatcg ctccctcaggg

20

<210> 2

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 2

atgcattctg cccccaagga

20

<210> 3

<211> 3811

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (285)...(2684)

<400> 3

acaggggccac tgctgctcac agaagcagtg aggatgatgc caggatgatg tctgcctcgc 60  
gcctggctgg gactctgatc ccagccatgg ccttcctctc ctgcgtgaga ccagaaagct 120  
gggagccctg cgtggagact tggccctaaa ccacacagaa gagctggcat gaaaccacaga 180  
gctttcagac tccggagcct cagcccttca ccccgattcc attgcttctt gctaaatgct 240  
gccgttttat cacggaggtg gttcctaata ttacttatca atgc atg gag ctg aat 296  
Met Glu Leu Asn

1

ttc tac aaa atc ccc gac aac ctg ccc ttc tca acc aag aac ctg gac 344  
Phe Tyr Lys Ile Pro Asp Asn Leu Pro Phe Ser Thr Lys Asn Leu Asp  
5 10 15 20

ctg	agc	ttt	aat	ccc	ctg	agg	cat	tta	ggc	agc	tat	agc	ttc	ttc	agt	392
Leu	Ser	Phe	Asn	Pro	Leu	Arg	His	Leu	Gly	Ser	Tyr	Ser	Phe	Phe	Ser	
				25					30					35		
ttc	cca	gaa	ctg	cag	gtg	ctg	gat	tta	tcc	agg	tgt	gaa	atc	cag	aca	440
Phe	Pro	Glu	Leu	Gln	Val	Leu	Asp	Leu	Ser	Arg	Cys	Glu	Ile	Gln	Thr	
				40					45					50		
att	gaa	gat	ggg	gca	tat	cag	agc	cta	agc	cac	ctc	tct	acc	tta	ata	488
Ile	Glu	Asp	Gly	Ala	Tyr	Gln	Ser	Leu	Ser	His	Leu	Ser	Thr	Leu	Ile	
				55					60					65		
ttg	aca	gga	aac	ccc	atc	cag	agt	tta	gcc	ctg	gga	gcc	ttt	tct	gga	536
Leu	Thr	Gly	Asn	Pro	Ile	Gln	Ser	Leu	Ala	Leu	Gly	Ala	Phe	Ser	Gly	
				70					75					80		
cta	tca	agt	tta	cag	aag	ctg	gtg	gct	gtg	gag	aca	aat	cta	gca	tct	584
Leu	Ser	Ser	Leu	Gln	Lys	Leu	Val	Ala	Val	Glu	Thr	Asn	Leu	Ala	Ser	
				85					90					95		
cta	gag	aac	ttc	ccc	att	gga	cat	ctc	aaa	act	ttg	aaa	gaa	ctt	aat	632
Leu	Glu	Asn	Phe	Pro	Ile	Gly	His	Leu	Lys	Thr	Leu	Lys	Glu	Leu	Asn	
				105					110					115		
gtg	gct	cac	aat	ctt	atc	caa	tct	ttc	aaa	tta	cct	gag	tat	ttt	tct	680
Val	Ala	His	Asn	Leu	Ile	Gln	Ser	Phe	Lys	Leu	Pro	Glu	Tyr	Phe	Ser	
				120					125					130		
aat	ctg	acc	aat	cta	gag	cac	ttg	gac	ctt	tcc	agc	aac	aag	att	caa	728
Asn	Leu	Thr	Asn	Leu	Glu	His	Leu	Asp	Leu	Ser	Ser	Asn	Lys	Ile	Gln	
				135					140					145		
agt	att	tat	tgc	aca	gac	ttg	cgg	gtt	cta	cat	caa	atg	ccc	cta	ctc	776
Ser	Ile	Tyr	Cys	Thr	Asp	Leu	Arg	Val	Leu	His	Gln	Met	Pro	Leu	Leu	
				150					155					160		
aat	ctc	tct	tta	gac	ctg	tcc	ctg	aac	cct	atg	aac	ttt	atc	caa	cca	824
Asn	Leu	Ser	Leu	Asp	Leu	Ser	Leu	Asn	Pro	Met	Asn	Phe	Ile	Gln	Pro	
				165					170					175		
ggt	gca	ttt	aaa	gaa	att	agg	ctt	cat	aag	ctg	act	tta	aga	aat	aat	872
Gly	Ala	Phe	Lys	Glu	Ile	Arg	Leu	His	Lys	Leu	Thr	Leu	Arg	Asn	Asn	
				185					190					195		
ttt	gat	agt	tta	aat	gta	atg	aaa	act	tgt	att	caa	ggt	ctg	gct	ggt	920
Phe	Asp	Ser	Leu	Asn	Val	Met	Lys	Thr	Cys	Ile	Gln	Gly	Leu	Ala	Gly	
				200					205					210		
tta	gaa	gtc	cat	cgt	ttg	gtt	ctg	gga	gaa	ttt	aga	aat	gaa	gga	aac	968
Leu	Glu	Val	His	Arg	Leu	Val	Leu	Gly	Glu	Phe	Arg	Asn	Glu	Gly	Asn	
				215					220					225		
ttg	gaa	aag	ttt	gac	aaa	tct	gct	cta	gag	ggc	ctg	tgc	aat	ttg	acc	1016
Leu	Glu	Lys	Phe	Asp	Lys	Ser	Ala	Leu	Glu	Gly	Leu	Cys	Asn	Leu	Thr	
				230					235					240		
att	gaa	gaa	ttc	cga	tta	gca	tac	tta	gac	tac	tac	ctc	gat	gat	att	1064
Ile	Glu	Glu	Phe	Arg	Leu	Ala	Tyr	Leu	Asp	Tyr						

245	250	255	260	
att gac tta ttt aat tgt ttg aca aat gtt tct tca ttt tcc ctg gtg				1112
Ile Asp Leu Phe Asn Cys Leu Thr Asn Val Ser Ser Phe Ser Leu Val	265	270	275	
agt gtg act att gaa agg gta aaa gac ttt tct tat aat ttc gga tgg				1160
Ser Val Thr Ile Glu Arg Val Lys Asp Phe Ser Tyr Asn Phe Gly Trp	280	285	290	
caa cat tta gaa tta gtt aac tgt aaa ttt gga cag ttt ccc aca ttg				1208
Gln His Leu Glu Leu Val Asn Cys Lys Phe Gly Gln Phe Pro Thr Leu	295	300	305	
aaa ctc aaa tct ctc aaa agg ctt act ttc act tcc aac aaa ggt ggg				1256
Lys Leu Lys Ser Leu Lys Arg Leu Thr Phe Thr Ser Asn Lys Gly Gly	310	315	320	
aat gct ttt tca gaa gtt gat cta cca agc ctt gag ttt cta gat ctc				1304
Asn Ala Phe Ser Glu Val Asp Leu Pro Ser Leu Glu Phe Leu Asp Leu	325	330	335	340
agt aga aat ggc ttg agt ttc aaa ggt tgc tgt tct caa agt gat ttt				1352
Ser Arg Asn Gly Leu Ser Phe Lys Gly Cys Cys Ser Gln Ser Asp Phe	345	350	355	
ggg aca acc agc cta aag tat tta gat ctg agc ttc aat ggt gtt att				1400
Gly Thr Thr Ser Leu Lys Tyr Leu Asp Leu Ser Phe Asn Gly Val Ile	360	365	370	
acc atg agt tca aac ttc ttg ggc tta gaa caa cta gaa cat ctg gat				1448
Thr Met Ser Ser Asn Phe Leu Gly Leu Glu Gln Leu Glu His Leu Asp	375	380	385	
ttc cag cat tcc aat ttg aaa caa atg agt gag ttt tca gta ttc cta				1496
Phe Gln His Ser Asn Leu Lys Gln Met Ser Glu Phe Ser Val Phe Leu	390	395	400	
tca ctc aga aac ctc att tac ctt gac att tct cat act cac acc aga				1544
Ser Leu Arg Asn Leu Ile Tyr Leu Asp Ile Ser His Thr His Thr Arg	405	410	415	420
gtt gct ttc aat ggc atc ttc aat ggc ttg tcc agt ctc gaa gtc ttg				1592
Val Ala Phe Asn Gly Ile Phe Asn Gly Leu Ser Ser Leu Glu Val Leu	425	430	435	
aaa atg gct ggc aat tct ttc cag gaa aac ttc ctt cca gat atc ttc				1640
Lys Met Ala Gly Asn Ser Phe Gln Glu Asn Phe Leu Pro Asp Ile Phe	440	445	450	
aca gag ctg aga aac ttg acc ttc ctg gac ctc tct cag tgt caa ctg				1688
Thr Glu Leu Arg Asn Leu Thr Phe Leu Asp Leu Ser Gln Cys Gln Leu	455	460	465	
gag cag ttg tct cca aca gca ttt aac tca ctc tcc agt ctt cag gta				1736
Glu Gln Leu Ser Pro Thr Ala Phe Asn Ser Leu Ser Ser Leu Gln Val	470	475	480	
cta aat atg agc cac aac aac ttc ttt tca ttg gat acg ttt cct tat				1784

1112  
 1160  
 1208  
 1256  
 1304  
 1352  
 1400  
 1448  
 1496  
 1544  
 1592  
 1640  
 1688  
 1736  
 1784

Leu Asn Met Ser His Asn Asn Phe Phe Ser Leu Asp Thr Phe Pro Tyr	
485 490 495 500	
aag tgt ctg aac tcc ctc cag gtt ctt gat tac agt ctc aat cac ata	1832
Lys Cys Leu Asn Ser Leu Gln Val Leu Asp Tyr Ser Leu Asn His Ile	
505 510 515	
atg act tcc aaa aaa cag gaa cta cag cat ttt cca agt agt cta gct	1880
Met Thr Ser Lys Lys Gln Glu Leu Gln His Phe Pro Ser Ser Leu Ala	
520 525 530	
ttc tta aat ctt act cag aat gac ttt gct tgt act tgt gaa cac cag	1928
Phe Leu Asn Leu Thr Gln Asn Asp Phe Ala Cys Thr Cys Glu His Gln	
535 540 545	
agt ttc ctg caa tgg atc aag gac cag agg cag ctc ttg gtg gaa gtt	1976
Ser Phe Leu Gln Trp Ile Lys Asp Gln Arg Gln Leu Leu Val Glu Val	
550 555 560	
gaa cga atg gaa tgt gca aca cct tca gat aag cag ggc atg cct gtg	2024
Glu Arg Met Glu Cys Ala Thr Pro Ser Asp Lys Gln Gly Met Pro Val	
565 570 575 580	
ctg agt ttg aat atc acc tgt cag atg aat aag acc atc att ggt gtg	2072
Leu Ser Leu Asn Ile Thr Cys Gln Met Asn Lys Thr Ile Ile Gly Val	
585 590 595	
tcg gtc ctc agt gtg ctt gta gta tct gtt gta gca gtt ctg gtc tat	2120
Ser Val Leu Ser Val Leu Val Val Ser Val Val Ala Val Leu Val Tyr	
600 605 610	
aag ttc tat ttt cac ctg atg ctt ctt gct ggc tgc ata aag tat ggt	2168
Lys Phe Tyr Phe His Leu Met Leu Leu Ala Gly Cys Ile Lys Tyr Gly	
615 620 625	
aga ggt gaa aac atc tat gat gcc ttt gtt atc tac tca agc cag gat	2216
Arg Gly Glu Asn Ile Tyr Asp Ala Phe Val Ile Tyr Ser Ser Gln Asp	
630 635 640	
gag gac tgg gta agg aat gag cta gta aag aat tta gaa gaa ggg gtg	2264
Glu Asp Trp Val Arg Asn Glu Leu Val Lys Asn Leu Glu Glu Gly Val	
645 650 655 660	
cct cca ttt cag ctc tgc ctt cac tac aga gac ttt att ccc ggt gtg	2312
Pro Pro Phe Gln Leu Cys Leu His Tyr Arg Asp Phe Ile Pro Gly Val	
665 670 675	
gcc att gct gcc aac atc atc cat gaa ggt ttc cat aaa agc cga aag	2360
Ala Ile Ala Ala Asn Ile Ile His Glu Gly Phe His Lys Ser Arg Lys	
680 685 690	
gtg att gtt gtg gtg tcc cag cac ttc atc cag agc cgc tgg tgt atc	2408
Val Ile Val Val Val Ser Gln His Phe Ile Gln Ser Arg Trp Cys Ile	
695 700 705	
ttt gaa tat gag att gct cag acc tgg cag ttt ctg agc agt cgt gct	2456
Phe Glu Tyr Glu Ile Ala Gln Thr Trp Gln Phe Leu Ser Ser Arg Ala	
710 715 720	

11  
 12  
 13  
 14  
 15  
 16  
 17  
 18  
 19  
 20  
 21  
 22  
 23  
 24  
 25  
 26  
 27  
 28  
 29  
 30  
 31  
 32  
 33  
 34  
 35  
 36  
 37  
 38  
 39  
 40  
 41  
 42  
 43  
 44  
 45  
 46  
 47  
 48  
 49  
 50  
 51  
 52  
 53  
 54  
 55  
 56  
 57  
 58  
 59  
 60  
 61  
 62  
 63  
 64  
 65  
 66  
 67  
 68  
 69  
 70  
 71  
 72  
 73  
 74  
 75  
 76  
 77  
 78  
 79  
 80  
 81  
 82  
 83  
 84  
 85  
 86  
 87  
 88  
 89  
 90  
 91  
 92  
 93  
 94  
 95  
 96  
 97  
 98  
 99  
 100





<211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Antisense Oligonucleotide  
  
 <400> 11  
 agggctaaac tctggatggg 20  
  
 <210> 12  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Antisense Oligonucleotide  
  
 <400> 12  
 ccagaaaagg ctcccagggc 20  
  
 <210> 13  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Antisense Oligonucleotide  
  
 <400> 13  
 gtccagaaaa ggctcccagg 20  
  
 <210> 14  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Antisense Oligonucleotide  
  
 <400> 14  
 tcatagggtt cagggacagg 20  
  
 <210> 15  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Antisense Oligonucleotide  
  
 <400> 15  
 aaaccagcca gaccttgaat 20  
  
 <210> 16  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

Year	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

20

20

20

20

20



acaagcacac tgaggaccga 20

<210> 22

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 22

gcagccagca agaagcatca 20

<210> 23

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 23

agctgaaatg gaggcacccc 20

<210> 24

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 24

gcagcaatgg ccacaccggg 20

<210> 25

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 25

ccacaacaat cacctttcgg 20

<210> 26

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 26

gcggctctgg atgaagtgct 20

<210> 27

<211> 20

<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 27  
ctccagaaga tgtgccgccc 20

<210> 28  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 28  
tccttgagat tagcagccct 20

<210> 29  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 29  
tgaaatgccc acctggaaga 20

<210> 30  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 30  
ctgagttggt tgaaatgccc 20

<210> 31  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 31  
catcttgcat caggagcccc 20

<210> 32  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

